CLAIMS:

1. A cable modem termination system for a cable plant comprising:

a burst receiver for processing data signals having physical layer parameters transmitted on an upstream channel of the cable plant;

a transmitter for sending messages on a downstream channel of the cable plant to cable modems;

a monitoring circuit for collecting packet based statistics representative of the quality of the upstream channel, the monitoring circuit sending a message to the transmitter for the cable modems to change a physical layer parameter responsive to the collected statistics and to the burst receiver to process data signals based on the changed physical layer parameter.

2. The cable modem termination system of claim 1, in which the monitoring circuit collects statistics about the number of packets and the number of undetected packets.

3. The cable modem termination system of claim 1, in which the monitoring circuit collects statistics about the number of packets and the number of packets without a unique word.

4. The cable modem termination system of claim 1, in which the monitoring circuit collects statistics about the number of packets and the number of packets with corrected errors.

5. The cable modem termination system of claim 1, in which the monitoring circuit collects statistics about the number of packets and the number of packets with uncorrectable errors.

6. The cable modem termination system of claim 1, in which the monitoring circuit collects statistics about the number of FEC blocks and the number of FEC blocks with corrected errors.

7. The cable modem termination system of claim 1, in which the monitoring circuit collects statistics about the number of FEC blocks and the number of FEC blocks with uncorrectable errors.

8. The cable modem termination system of claim 1, 2, 3, 4, 5, 6, or 7, in which the monitoring circuit sends a message to change the type of modulation.

9. The cable modem termination system of claim 1, 2, 3, 4, 5, 6, or 7, in which the monitoring circuit sends a message to change the coding gain.

10. The cable modem termination system of claim 1, 2, 3, 4, 5, 6, or 7, in which the monitoring circuit sends a message to change the symbol rate.

11. The cable modem termination system of claim 1, 2, 3, 4, 5, 6, or 7, in which the monitoring circuit sends a message to change the guard time.

12. The cable modem termination system of claim 1, 2, 3, 4, 5, 6, or 7, in which the monitoring circuit sends a message to change the constellation size of the modulation.

13. The cable modem termination system of claim 1, 2, 3, 4, 5, 6, or 7 in which the monitoring circuit sends a message to change the physical layer parameters in real time.

14. The cable modem termination system of claim 1 , 2, 3, 4, 5, 6, or 7 in which the monitoring circuit sends a message to change the frequency of the carrier.

15. The cable modem termination system of claim 1 , 2, 3, 4, 5, 6, or 7 in which the monitoring circuit sends a message to change the frequency of the carrier in a non-uniform manner..

16. A headend terminal for a bidirectional asymmetric, transmission system having a downstream channel that broadcasts data from the head end terminal to a plurality of subscriber terminals and an upstream channel that unicasts data from the individual subscriber terminals to the head end terminal, the headend terminal comprising:

a burst receiver for processing data signals having physical layer parameters transmitted on the upstream channel;

a transmitter for sending messages on the downstream channel;

a monitoring circuit for collecting statistics about the physical layer parameters transmitted on the upstream channel, the monitoring circuit sending a message to the transmitter for the cable modems to change a physical layer parameter responsive to the collected statistics and to the burst receiver to process data signals based on the changed physical layer parameter.

17. A method for transmitting data over a cable system in an upstream direction to a headend from a plurality of subscriber stations located different distances from the headend such that the transmission paths to the headend are different, the method comprising the steps of:

establishing an upstream channel from the subscriber stations to the headend;

monitoring at the headend the quality of the upstream channel;

establishing a downstream channel from the headend to the subscriber stations;

transmitting to the subscriber stations over the downstream channel a command to change the mode of transmission to the headend over the upstream channel if the monitored quality fails to meet a prescribed threshold level;

receiving the command at the subscriber stations; and

transmitting data over the upstream channel from the subscriber stations to the headend in accordance with the changed mode of transmission after receipt of the command.

18. The method of claim 17, in which the monitoring step monitors the noise power on the upstream channel.

19. The method of claim 17, in which the monitoring step monitors the signal-to-noise ratio of a signal received on the upstream channel.

20. The method of claim 17, in which the monitoring step monitors the channel statistics of the upstream channel.

21. The method of claim 20, in which the monitored statistics comprise the number of undetected packets.

22. The method of claim 20, in which the monitored statistics comprise the number of packets with corrected errors.

23. The method of claim 20, in which the monitored statistics comprise the number of packets with uncorrected errors.

24. The method of claim 20, in which the monitored statistics comprise the number of FEC blocks with corrected errors.

25. The method of claim 20, in which the monitored statistics comprise the number of FEC blocks with uncorrected errors.

26. The method of claim 20, in which the monitored statistics comprise a combination of two or more of the following: the number of undetected packets, the number of packets with corrected errors, the number of packets with uncorrected errors, the number of FEC blocks with corrected errors, and the number of FEC blocks with uncorrected errors.

27. The method of claim 17, in which the command transmitting step comprises transmitting a command to change the type of modulation from a first type that can reliably transmit at a high bit rate over a high quality channel to a second type that can reliably transmit at a lower bit rate over a lower quality channel if the monitored quality at the first type of modulation fails to meet the prescribed threshold level.

28. The method of claim 27, in which the first type of modulation is QAM and the second type of modulation is QPSK.

29. The method of claim 27, in which the data transmitting step transmits data to the headend in accordance with the second type of modulation after the command.

30. The method of claim 29, in which the command transmitting step additionally comprises transmitting a command to change the position of the channel in the spectrum if the monitored quality at the second type of modulation fails to meet the prescribed threshold level.

31. The method of claim 30, in which the command transmitting step additionally comprises transmitting a command to change one or more physical layer parameters.

32. The method of claim 17, in which the step of establishing an upstream channel establishes a channel that has a narrow bandwidth and the step of establishing a downstream channel establishes a channel that has a broad bandwidth.

33. The method of claim 17, additionally comprising the step of adjusting a notch filter at the headend to establish coefficients that reject one or more bands of common noise.

34. The method of claim 33, in which the monitoring step comprises FFT processing of the filter coefficients to determine the inverse of the channel spectrum.

35. The method of claim 34, in which the command transmitting step transmits a command to change the position of the channel in the spectrum to avoid ingress noise.

36. A cable modem transmission system having an upstream channel shared among a plurality of cable modems and a burst receiver connected to the upstream channel to process physical layer signals transmitted on the upstream channel, a monitoring circuit for collecting packet based statistics representative of the quality of the upstream channel, the monitoring circuit comprising an input for receiving the physical layer signals from the burst receiver, means for sensing parameters of the physical layer signals, and a plurality of counters for collecting the sensed physical layer parameters.

37. The cable modem termination system of claim 36, in which the monitoring circuit collects statistics about the number of packets and the number of undetected packets.

38. The cable modem termination system of claim 36 or 37, in which the monitoring circuit collects statistics about the number of packets and the number of packets without a unique word.

39. The cable modem termination system of claim 36 or 37, in which the monitoring circuit collects statistics about the number of packets and the number of packets with corrected errors.

40. The cable modem termination system of claim 36 or 37, in which the monitoring circuit collects statistics about the number of packets and the number of packets with uncorrectable errors.

41. The cable modem termination system of claim 36 or 37, in which the monitoring circuit collects statistics about the number of FEC blocks and the number of FEC blocks with corrected errors.

42. The cable modem termination system of claim 36 or 37, in which the monitoring circuit collects statistics about the number of FEC blocks and the number of FEC blocks with uncorrectable errors.